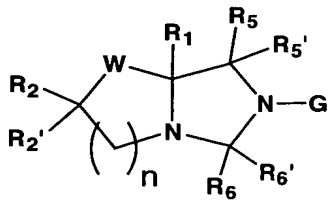
WHAT IS CLAIMED IS:

1. A compound according to formula I



I

wherein

R_1 is selected from hydrogen (H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, arylalkyl or substituted arylalkyl, CO_2R_4, $CONR_4R_4$' and CH_2OR_4;

R_2 and R_2' are each independently selected from hydrogen (H), alkyl, substituted alkyl, OR_3, SR_3, halo, NHR_4, $NHCOR_4$, $NHCO_2R_4$, $NHCONR_4R_4$' and $NHSO_2R_4$;

and at least one of R_2 and R_2' is H or alkyl, with the exception that R_2 and R_2' can both be OR_3 when R_3 is not H;

R_3 in each functional group is independently selected from hydrogen (H), alkyl or substituted alkyl, CHF_2, CF_3 and COR_4;

R_4 and R_4' in each functional group are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, and heteroaryl or substituted heteroaryl;

R_5 and R_5' are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, and heteroaryl or substituted heteroaryl, wherein at least one of

R_5 and R_5' is hydrogen, or R_5 and R_5' taken together can form a double bond with oxygen (O), sulfur (S), NR_7 or CR_7R_7';

R_6 and R_6' are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, and heteroaryl or substituted heteroaryl, wherein at least one of R_6 and R_6' is hydrogen, or R_6 and R_6' taken together can form a double bond with oxygen (O), sulfur (S), NR_7 or CR_7R_7';

R_7 and R_7' in each functional group are each independently selected from hydrogen(H), OR_4, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

G is an aryl, heterocyclo or heteroaryl group, wherein said group is mono- or polycyclic, and which is optionally substituted with one or more substitutents selected from hydrogen, halo, CN, CF_3, OR_4, CO_2R_4, NR_4R_4', $CONR_4R_4$', CH_2OR_4, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl; and

W is selected from (CR_6R_6'), $C(R_6)OR_3$, $C(R_6)(NR_4R_4')$,

n is an integer of 1 or 2;

including all prodrug esters, pharmaceutically acceptable salts and stereoisomers thereof,

with the following provisos:

(a) when R_5 and R_5' and/or R_6 and R_6' form a double bond with CR_7R_7', when either R_7 or R_7' is OR_4, R_4 is not hydrogen;

(b) excluding compounds where the following occur simultanously:

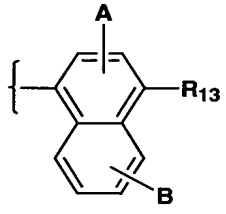
R_2 or R_2' are hydrogen, OR_3, halo, $NHCOR_4$, $NHCO_2R_4$, $NHCONR_4R_4$' or $NHSO_2R_4$;

R_5 and R_5' are hydrogen or form a double bond with oxygen or sulfur;

R_6 and R_6' are hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, or heteroaryl or substituted heteroaryl, wherein at least one of R_6 and R_6' is hydrogen, or R_6 and R_6' taken together form a double bond with oxygen (O), sulfur (S) or NR_7;

R_7 is hydrogen, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, or heteroaryl or substituted heteroaryl; and

G has the following structure:



wherein

R_{13} is selected from hydrogen (H), cyano (-CN), nitro (-NO_2), halo, heterocyclo, OR_{14}, CO_2R_{15}, $CONHR_{15}$, COR_{15}, $S(O)_pR_{15}$, $SO_2NR_{15}R_{15}$', $NHCOR_{15}$ and $NHSO_2R_{15}$;

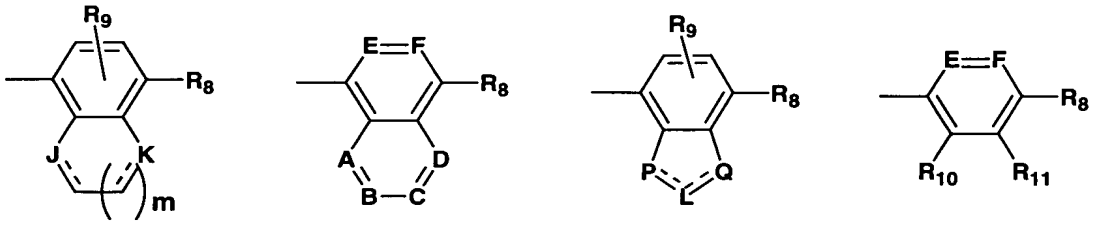
R_{14} in each functional group is independently selected from hydrogen (H), alkyl or substituted alkyl, CHF_2, CF_3 and COR_{15};

R_{15} and R_{15}' in each functional group are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, heterocycloalkyl or substituted heterocycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heteroaryl or substituted heteroaryl and -CN;

A and B are each independently selected from hydrogen (H), halo, cyano(-CN), nitro(-NO_2), alkyl or substituted alkyl and OR_{14}; and

p is an integer from 0 to 2.

2. The compound according to claim 1 wherein G is selected from:



wherein

R_8, R_9, R_{10} and R_{11} are each independently selected from hydrogen (H), NO_2 , CN, CF_3, OR_4, CO_2R_4, NR_4R_4', $CONR_4R_4'$, CH_2OR_4, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

A to F is each independently selected from N or CR_9;

J, K, L, P and Q are each independently selected from NR_{12}, O, S, SO, SO_2 or $CR_{12}R_{12}'$;

R_{12} and R_{12}' in each functional group are each independently selected from a bond or R_1; and

m is an integer of 0 or 1.

3. The compound according to claim 2 wherein

R_1 is hydrogen (H) or alkyl;

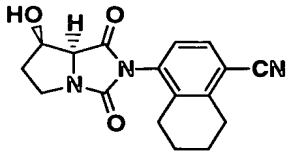
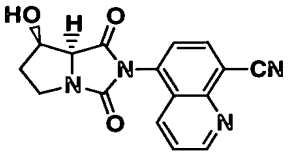
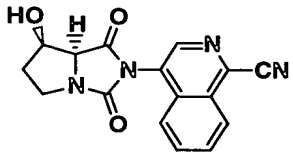
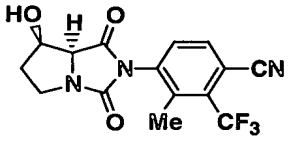
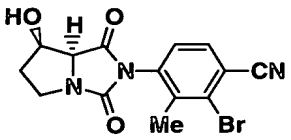
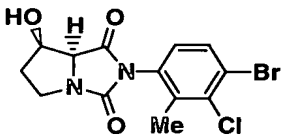
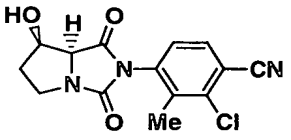
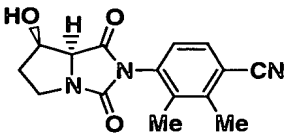
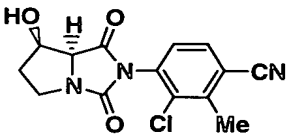
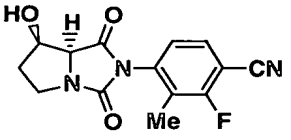
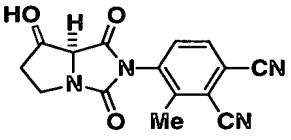
R_2 or R_2' is hydroxyl (OH);

R_5 and R_5' are hydrogen or are taken together form a double bond with oxygen (O) or sulfur (S); and

R_6 and R_6' are taken together form a double bond with oxygen (O) or sulfur (S).

4. The compound according to claim 2 wherein R_8 is CN.

5. The compound according to claim 1 selected from: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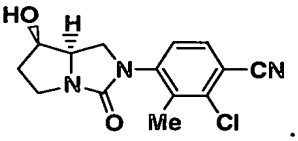
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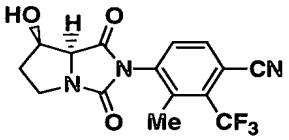
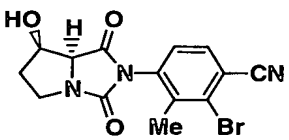
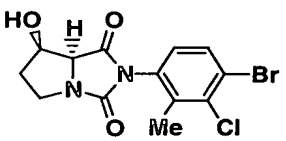
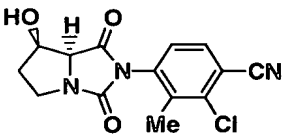
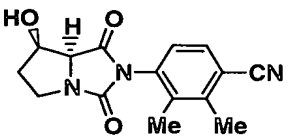
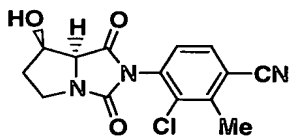
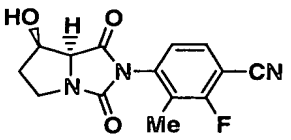
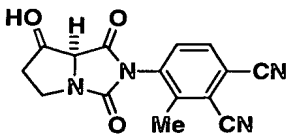
6. The compound according to claim 1 selected from: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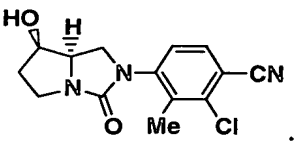
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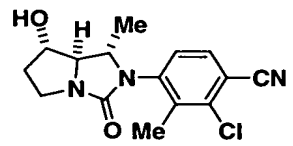
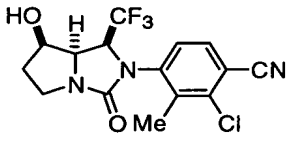
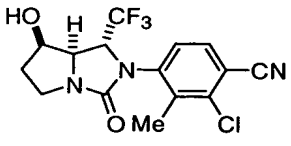
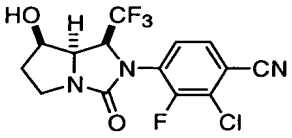
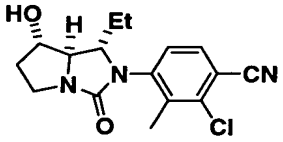
7. The compound according to claim 1 selected from: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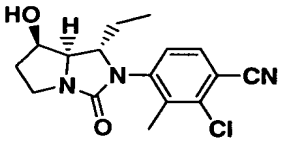
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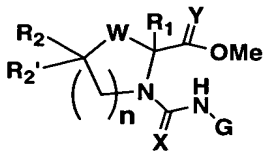
8. A compound according to formula Ih



Ih

wherein

R_1 is selected from hydrogen (H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, arylalkyl or substituted arylalkyl, CO_2R_4, $CONR_4R_4$' and CH_2OR_4;

R_2 and R_2' are each independently selected from hydrogen (H), alkyl, substituted alkyl, OR_3, SR_3, halo, NHR_4, $NHCOR_4$, $NHCO_2R_4$, $NHCONR_4R_4$' and $NHSO_2R_4$;

and at least one of R_2 and R_2' is H or alkyl, with the exception that R_2 and R_2' can both be OR_3 when R_3 is not H;

R_3 in each functional group is independently selected from hydrogen (H), alkyl or substituted alkyl, CHF_2, CF_3 and COR_4;

R_4 and R_4' in each functional group are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, and heteroaryl or substituted heteroaryl;

X and Y are each independently oxygen (O) or sulfur (S);

G is an aryl, heterocyclo or heteroaryl group, wherein said group is mono- or polycyclic, and which is optionally substituted with one or more substitutents selected from the group consisting of hydrogen, halo, CN, CF_3, OR_4, CO_2R_4, NR_4R_4', $CONR_4R_4$', CH_2OR_4, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl; and

W is selected from (CR_6R_6'), $C(R_6)OR_3$, $C(R_6)(NR_4R_4')$,

n is an integer of 1 or 2;

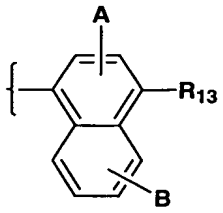
including all prodrug esters, pharmaceutically acceptable salts and stereoisomers thereof,

with the following proviso:

(a) excluding compounds where the following occur simultanously:

R_2 or R_2' is hydrogen, OR_3, halo, $NHCOR_4$, $NHCO_2R_4$, $NHCONR_4R_4$' or $NHSO_2R_4$; and

G has the following structure:



wherein

R_{13} is selected from hydrogen (H), cyano (-CN), nitro (-NO_2), halo, heterocyclo, OR_{14}, CO_2R_{15}, $CONHR_{15}$, COR_{15}, $S(O)_pR_{15}$, $SO_2NR_{15}R_{15}$', $NHCOR_{15}$ and $NHSO_2R_{15}$;

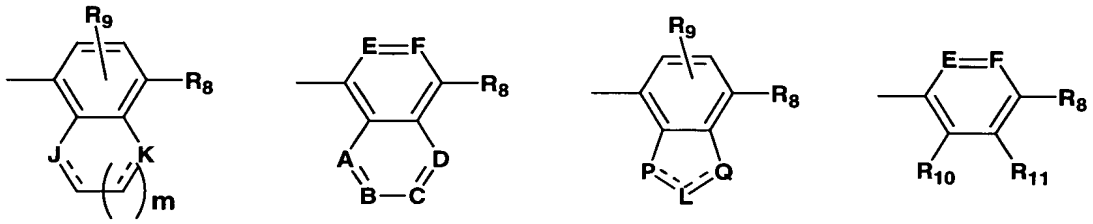
R_{14} in each functional group is independently selected from (H), alkyl or substituted alkyl, CHF_2, CF_3 and COR_{15};

R_{15} and R_{15}' in each functional group are each independently selected from hydrogen(H), alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, heterocycloalkyl or substituted heterocycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl, heteroaryl or substituted heteroaryl and -CN;

A and B are each independently selected from hydrogen (H), halo, cyano(-CN), nitro(-NO_2), alkyl or substituted alkyl and OR_{14}; and

p is an integer from 0 to 2.

9. The compound according to claim 8 wherein G is selected from:



wherein

R_8, R_9, R_{10} and R_{11} in each functional group are each independently selected from hydrogen (H), NO_2 , CN, CF_3, OR_4, CO_2R_4, NR_4R_4', $CONR_4R_4$', CH_2OR_4, alkyl or substituted alkyl, alkenyl or substituted alkenyl, alkynyl or substituted alkynyl, cycloalkyl or substituted cycloalkyl, arylalkyl or substituted arylalkyl, aryl or substituted aryl and heteroaryl or substituted heteroaryl;

A to F is each independently selected from N or CR_9;

J, K, L, P and Q are each independently selected from NR_{12}, O, S, SO, SO_2 or $CR_{12}R_{12}$';

R_{12} and R_{12}' in each functional group are each independently selected from a bond or R_1; and

m is an integer of 0 or 1.

10. The compound according to claim 9 wherein

R_1 is hydrogen (H) or alkyl; and

R_2 or R_2' is hydroxyl (OH).

11. The compound according to claim 9 wherein R_8 is CN.

12. A pharmaceutical composition, comprising:

(a) a compound according to claim 1; and

(b) at least one pharmaceutically acceptable diluent or carrier.

13. The pharmaceutical composition according to claim 12, further comprising at least one additional therapeutic agent selected from other compounds of formula I, parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents, and thyroid mimetics.

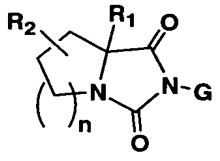
14. The pharmaceutical composition according to claim 13, wherein the additional therapeutic agent is selected from the group consiting of growth hormone secretagogues and growth hormone.

15. A method for treating or delaying the progression or onset of muscular atrophy, lipodistrophy, long-term critical illness, sarcopenia, frailty or age-related functional decline, reduced muscle strength and function, reduced bone density or growth, the catabolic side effects of glucocorticoids, chronic fatigue syndrome, bone fracture repair, acute fatigue syndrome and muscle loss

following elective surgery, cachexia, chronic catabolic state, eating disorders, side effects of chemotherapy, wasting, depression, nervousness, irritability, stress, growth retardation, reduced cognitive function, male contraception, hypogonadism, Syndrome X, diabetic complications or obesity, which comprises administering to a mammalian species in need of treatment a therapeutically effective amount of a pharmaceutical composition as defined in claim 1.

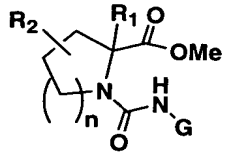
16. The method according to claim 15 further comprising administering, concurrently or sequentially, a therapeutically effective amount of at least one additional therapeutic agent selected from the group consisting of other compounds formula I, parathyroid hormone, bisphosphonates, estrogen, testosterone, progesterone, selective estrogen receptor modulators, growth hormone secretagogues, growth hormone, progesterone receptor modulators, anti-diabetic agents, anti-hypertensive agents, anti-inflammatory agents, anti-osteoporosis agents, anti-obesity agents, cardiac glycosides, cholesterol lowering agents, anti-depressants, anti-anxiety agents, anabolic agents and thyroid mimetics.

17. A process for preparing a compound of formula Id



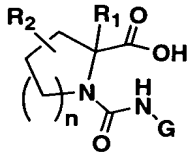
Id ,

which comprises hydrolyzing a compound of formula IVa



IVa

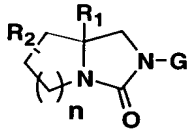
under basic conditions to give the compound of formula XIX



XIX

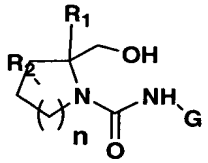
which is then carried on to a compound of formula Id with the use of a coupling reagent.

18. A process for preparing a compound of formula Ie



Ie

which comprises optionally protecting the compound of formula IVa, when R2 is OH, with a protecting group by treatment with a silylating reagent and then reduced with a reducing agent to give a compound of formula XX

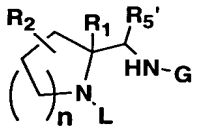


XX

which is then derivatized with a leaving group and p-toluenesulfonyl chloride and then treated with a base to give the compound of formula Ie.

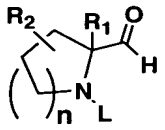
19. The process of claim 18 wherein the protecting group is tert-Butyldimethylsilyl; the silylating reagent is tert-Butyldimethylsilyl (chloride); the reducing agent is lithium aluminum hydride or lithium borohydride; the leaving group is Tosyl; the base is potassium tert-butoxide.

20. A process for preparing a compound of formula XII ,



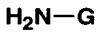
XII ,

which comprises reacting an aldehyde of formula IX



IX

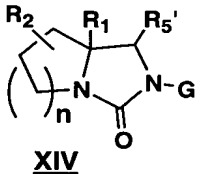
with an amine of formula XV



XV

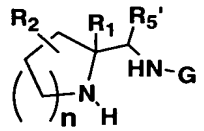
in the presence of a reducing agent to give the compound of formula XII.

21. A process for preparing a compound of formula XIV



XIV ,

which comprises subjecting the compound of formula XII prepared by the process of claim 18 to N-deprotection to form a compound of formula XIII



XIII

and reacting the compound of formula XIII with phosgene or a phosgene equivalent in the presence of a base to form the compound of formula XIV.